DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Agency for Toxic Substances
and Disease Registry
Atlanta GA 30333

November 16, 2017

Stephen M. Brittle
President
Don't Waste Arizona
2934 West Northview Avenue
Phoenix, Arizona 85051

Dan Mack
Chairman
STOPP
PO Box 1075
Tonopah, Arizona 85354

Dear Mr. Brittle and Mr. Mack:

Thank you for your email of April 17, 2017, sent to Dr. Sven E. Rodenbeck, Petition Coordinator, Agency for Toxic Substances and Disease Registry (ATSDR). In the email, you indicated that the Hickman's Family Farms egg production facilities in Arlington and Tonopah, Arizona are releasing ammonia at levels of potential health concern and you requested that ATSDR conduct a public health assessment.

ATSDR has reviewed the information you provided and additional information we obtained from other sources. As discussed in the enclosure with this letter, we have determined that we need additional information regarding the air quality near the Hickman's Family Farms egg production facilities before we can evaluate whether exposures to airborne hazardous substances might be affecting the health of nearby residents. ATSDR proposes to collect information on ammonia, hydrogen sulfide, and possibly other contaminants with input from community members, Hickman's Family Farms, and federal, state, and local environmental and health agencies. ATSDR can commit to conducting air monitoring near one of the facilities (i.e. Tonopah or Arlington), though we will explore the feasibility of monitoring at both.

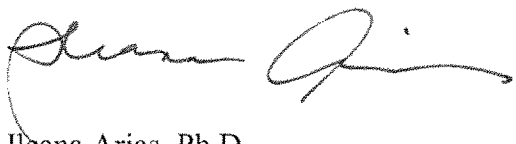
Before ATSDR will conduct air monitoring, we would like to meet with community members near these facilities to get people's input on this air-monitoring project. We would appreciate your assistance in coordinating meetings with residents. If you are willing to assist ATSDR in coordinating meetings, please contact Ben Gerhardstein in our Region 9 Office, San Francisco, California, at (415) 947-4316 or bgerhardstein@cdc.gov.

Please remember that ATSDR is a non-regulatory public health agency and does not determine whether any environmental laws or regulations have been violated. ATSDR can assess whether

people were or are exposed to site-related contaminants at levels that might be harmful and work to prevent those exposures. However, we typically are unable to determine the exact cause of an individual's disease or medical condition.

Thank you for raising your concerns to ATSDR and bringing them to our attention. If you have any questions about how ATSDR is evaluating your petition request, please contact Dr. Sven Rodenbeck by telephone at (770) 488-3660 or via email at Srodenbeck@cdc.gov. You can also contact Ben Gerhardstein in our Region 9 Office, San Francisco, California, at (415) 947-4316 or bgerhardstein@cdc.gov .

Sincerely,



Ileana Arias, Ph.D.
Director
Division of Community Health Investigations
Agency for Toxic Substances and Disease Registry

Cc:
Sven E. Rodenbeck, ATSDR
Ben Gerhardstein, ATSDR Region IX

Enclosure for Petition Decision Letter Regarding the Hickman's Family Farms Egg Production Facilities in Arlington and Tonopah, Arizona

Background

On April 17, 2017, the Agency for Toxic Substances and Disease Registry (ATSDR) received a petition from ***Don't Waste Arizona*** (http://dontwastearizona.org/) and ***STOPP*** (Save Tonopah Oppose Poultry Production, http://tonopahstopp.com/) concerning ammonia air emissions originating from the Hickman's Family Farms' (http://www.hickmanseggs.com/) egg production facilities in Arlington and Tonopah, Arizona. The two citizen groups are concerned that the ammonia air emissions are impacting the health of people living and working near the facilities.

In addition, the Arlington Elementary School Board sent a May 3, 2017, letter to ATSDR supporting ***Don't Waste Arizona*** and ***STOPP*** petition requests. The Arlington Elementary School Board offered to allow ATSDR to conduct ambient air sampling on its property. The Arlington Elementary School is located approximately 3 miles due west of the Arlington Hickman's Family Farms. The Tonopah and Arlington facilities are 15 miles from each other.

Started as a family farm in 1994, the Hickman's Family Farms has grown to become the largest egg producer in the southwest United States. The family owned company operates four Arizona locations (Arlington South, Arlington North, Maricopa, and Tonopah), which house a combined laying hen population of over 5 million and produce approximately 27 million eggs a week. The chicken manure is composted on-site at the Arlington facilities and sold as organic fertilizer.

The Hickman's Family Farms Arlington (north and south) and Tonopah facilities are located in Maricopa County, and are west of Phoenix, Arizona.

Hickman's Family Farms Arizona facilities are classified as minor air emission sources. The Arizona Department of Environmental Quality (ADEQ) and Maricopa County Air Quality Department have jurisdiction over certain air emissions at each facility. ADEQ, Maricopa County, and Hickman's Family Farms have conducted periodic ammonia and hydrogen sulfide fence line monitoring.

Hickman's Family Farms also has a facility similar to the Arlington and Tonopah facilities in Riverside, California. A local California air district has designated the Hickman's Family Farms California facility as a major air emission source.

Public Health Evaluation

ATSDR evaluates environmental sampling data by comparing the environmental sampling results to human health-based comparison screening values that ATSDR or other federal and state agencies have established. If the sampling results show that the level of a contaminant is less than an established human health-based comparison screening value, it is unlikely that the contaminant would affect human health and ATSDR would not conduct an in-depth evaluation

of that particular contaminant. If the results are greater than the human health-based comparison screening value, then ATSDR conducts a more in-depth evaluation to determine if there is a public health hazard.

Available Air Monitoring Results

ADEQ and the Maricopa County Air Quality Department provided ATSDR with ammonia and hydrogen sulfide ambient air monitoring results (September 2016 through April 2017), which Hickman's Family Farms conducts once a month at several locations on the facilities' property or just outside of the facilities' fence lines (four locations at the Arlington facilities and five at Tonopah). Table 1 provides a general overview of the ammonia and hydrogen sulfide ambient air monitoring results for the Hickman's Family Farms Arlington and Tonopah facilities. Hickman's Family Farms use the Jerome X6310002 Gold Film Hydrogen Sulfide Analyzer (detection limit of 0.001 parts per million [ppm]) and the BW Technologies Gas Alert ammonia meter (detection limit of 1 ppm) to conduct the air monitoring. Single instantaneous readings are taken for ammonia. The hydrogen sulfide results represent multiple readings taken within 30 minutes.

Because the Hickman's Family Farms monitoring is only conducted over a very short time period once a month, the results cannot be used to determine whether ammonia or hydrogen sulfide ambient air levels at or near the facilities' fence line are at levels of health concern for intermediate (14 – 364 days) or chronic (1 year or more) exposure durations. In addition, the once a month monitoring tend to be conducted during the late morning or early afternoon (between 10 AM and 3 PM), which might not represent the ambient air levels during night hours when atmospheric conditions tend to be more stable and potentially result in higher ambient air levels at the facilities or nearby locations.

The detection limit of the ammonia instrument (1 ppm) used by Hickman's Family Farms is above the ATSDR chronic air environmental media evaluation guide (EMEG) for ammonia, a health-based comparison value, of 0.1 ppm. The ATSDR acute air ammonia EMEG is 1.7 ppm. From October 2016 through April 2017, ammonia was only detected by the Hickman's Family Farms once at the Arlington facility (at one ppm) and not at the Tonopah facility.

From October 2016 through April 2017, the highest reported detection of hydrogen sulfide was 0.017 ppm. The U.S. Environmental Protection Agency (EPA) hydrogen sulfide air Reference Concentration (RfC) value, a chronic health-based comparison value, is 0.001 ppm. ATSDR has established a hydrogen sulfide intermediate and acute EMEG of 0.02 ppm and 0.07 ppm, respectively. According to the Hickman's Family Farms ambient air monitoring result, hydrogen sulfide was detected above the EPA RfC at or near the Tonopah facility 75% of the time; hydrogen sulfide was detected above the EPA RfC at or near the Arlington facility 25% of the time.

On April 25, 2017, ADEQ staff conducted ammonia ambient air monitoring near the Hickman's Family Farms south Arlington facility fence line. A MultiRAE Lite (PGM-6208) was used for about one hour and 53 individual one-minute sampling results were recorded. The MultiRAE Lite (PGM-6208) had a detection limit of 1 ppm, which is above the ATSDR ammonia chronic

air EMEG of 0.1 ppm. Ammonia was detected 26 times during the 53 sampling events (49%) at the Arlington facility with a maximum detection of 2 ppm.

Air Modeling

ADEQ used AERMOD to model ambient ammonia air concentrations due to emissions from the Hickman's Family Farms facilities. An ATSDR technical staff member reviewed the ADEQ modeling methodology and concluded that the modeling approach appears to be sound. However, there is some uncertainty as to whether the emission rate (i.e., the amount of ammonia emitted into the air from each laying hen) used by ADEQ is representative of the Hickman's Family Farms operations because the emission rate used is based on work conducted at different facilities in different geographic regions. For example, information presented at a recent EPA webinar suggests that air emissions might be higher at agricultural animal facilities in warmer climates. There is also some uncertainty as to the number of laying hens present at each Hickman's Family Farms facility (either actual or potential for future increases). The ADEQ model report estimates a maximum annual ammonia fence line concentration, maximum 24-hour ammonia concentrations, and maximum 1-hour ammonia concentrations, at both facilities' fence line and populated areas. The ADEQ model output files provided to ATSDR only contained estimated ammonia ambient air concentrations. In addition, the data files did not distinguish between populated and unpopulated geographical areas.

The ADEQ model output predicted a maximum annual ammonia fence line concentration, a maximum 24-hour average concentration, and a maximum one-hour fence line concentration of 1.5 ppm, 8.2 ppm, and 49.8 ppm, respectively. When compared to the ATSDR ammonia EMEGs of 0.1 ppm for chronic exposure and 1.7 ppm for acute exposure, these modeling results would tend to indicate that there is a potential for people to be exposed to ambient ammonia air concentrations at levels of health concern at the facility fence lines.

While hydrogen sulfide ambient air concentrations are not explicitly presented in the ADEQ modeling output provided to ATSDR, an ammonia/hydrogen sulfide ratio can be used to adjust the ADEQ predicted ammonia concentrations for the same averaging time to estimate hydrogen sulfide modeled concentrations. This can be done because the ammonia and hydrogen sulfide are emitted from the same source with the only difference being different emission rates. By adjusting the ADEQ ammonia modeled results, ATSDR estimated that the annual hydrogen sulfide fence line concentration, a maximum 24-hour average hydrogen sulfide fence line concentration, and a maximum one-hour hydrogen sulfide fence line concentration of 0.033 ppm, 0.18 ppm, and 1.094 ppm, respectively. When compared to the hydrogen sulfide the EPA RfC of 0.001 ppm, the analysis tends to indicate that there is a potential for people to be exposed to hydrogen sulfide at levels of health concern at the facility fence lines. In addition, a comparison to the ATSDR intermediate and acute health-based comparison values (0.07 ppm and 0.02 ppm, respectively) would tend to indicate there is a potential for people to be exposed to hydrogen sulfide at levels of health concerns.

In addition to the limitations discussed above (i.e., uncertainty of the emissions rate and the number of laying hens per facility), the modeling grid is not sufficiently dense to identify maximum impacts at populated locations. With the current inputs, there are offsite locations with

maximum modeled concentrations that exceed acute health-based comparison values for both ammonia and hydrogen sulfide. However, the modeled concentrations are much higher than any of the monitored results. Some possible reasons for this discrepancy could include:

- differences in location between maximum modeled concentration and monitoring locations,
- errors in model inputs (e.g., emission rates that are too high),
- lack of sufficient temporal coverage of monitoring results (only collected once per month over short interval),
- overly conservative model resulting in over prediction of actual concentrations, and
- faulty instrumentation.

Overall, the ADEQ modeling results indicate that there might be offsite areas where people could be exposed to ammonia and hydrogen sulfide at levels of health concern. But the predicted modeling results are higher than the available ambient air monitoring data. Therefore, it is not possible to say with certainty that there are locations near the Hickman's Family Farms Arlington and Tonopah facilities where people might be exposed to ammonia and hydrogen sulfide ambient air concentrations at levels of health concern.

Findings

The ammonia air monitoring instruments used by Hickman's Family Farms and ADEQ do not have the capability to detect whether ammonia air emissions from the Hickman's Family Farms Arlington and Tonopah facilities are at levels of health concern for intermediate and chronic duration exposures. For ATSDR to determine if ammonia emissions from the Hickman's Family Farms Arlington and Tonopah facilities are affecting the health of nearby residents, long-term ammonia ambient air monitoring would need to be conducted 24-hours a day for several weeks.

The short-term (less than 30 minutes) ambient air monitoring conducted monthly by Hickman's Family Farms have detected elevated levels of hydrogen sulfide at and near the Arlington and Tonopah facilities. However, ATSDR cannot use the Hickman's Family Farms hydrogen sulfide ambient air monitoring results to determine if people are exposed to the hydrogen sulfide at levels of health concern because the ambient air monitoring was only conducted for over a short time period (less than 30 minutes) once a month. In addition, it is unclear whether the monitoring results represent the hydrogen sulfide air concentrations in the nearby residential area. For ATSDR to determine if hydrogen sulfide emissions from the Hickman's Family Farms Arlington and Tonopah facilities are affecting the health of nearby residents, long-term hydrogen sulfide ambient air monitoring would need to be conducted 24-hours a day for several weeks.

The ADEQ modeling results indicate that there might be offsite areas where people could be exposed to ammonia and hydrogen sulfide at levels of health concern, but the modeling results are higher than the available ambient air monitoring data. Hence, ATSDR cannot determine with certainty that there are locations near the Hickman's Family Farms Arlington and Tonopah facilities where people might be exposed to ammonia and hydrogen sulfide ambient air concentrations at levels of health concern.

Conclusion

The currently available short-term air monitoring results and air modeling is not of sufficient for ATSDR to provide a meaningful response to the petitioners' request. ATSDR should conduct a site-scoping visit to help determine the type and extent of air monitoring activities the agency should consider conducting. ATSDR should meet with all potential partners during site scoping visit (i.e., petitioners, community member, Hickman's Family Farms, and federal, state and local environmental and health agencies).

Table 1
Summary of Ammonia and Hydrogen Sulfide Ambient Air Monitoring Results Conducted at and Near Hickman's Family Farms Arlington and Tonopah Facilities, Arizona
(September 2016 – April 2017)

Chemical	Arlington Facility (ppm)	Tonopah Facility (ppm)	Health Comparison Values
Ammonia	ND - 2	ND	0.1 ppm - Chronic, ATSDR EMEG/MRL 1.7 ppm - Acute, ATSDR EMEG/MRL
Hydrogen Sulfide	ND – 0.017	ND – 0.007	0.001 - ppm EPA RfC 0.02 ppm - Intermediate, ATSDR EMEG/MRL 0.07 ppm - Acute, ATSDR EMEG/MRL

ND – non detect
ppm – parts per million (volume)
EMEG – Environmental Media Exposure Guideline
MRL – Minimal Risk Level
ATSDR – Agency for Toxic Substances and Disease Registry
EPA – U.S. Environmental Protection Agency
RfC – Reference Concentration
Chronic: exposures lasting 365 days or longer
Intermediates exposures of 15 to 364 days duration
Acute: exposures lasting 14 days or less